

The Implementation of Cognitive Strategy in Teaching English at SMPN 2 Sungguminasa

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Abstract

This research aims to determine the implementation of cognitive strategy in teaching English and the influence of implementing cognitive strategy on students' English learning process. Researchers conducted this research at SMPN 2 Sungguminasa. This research method is descriptive qualitative. The instruments in this research are observation, interviews and documentation. Data collection was carried out using observation sheets and interview techniques. Participants in this research were two English teachers at SMPN 2 Sungguminasa. The results of this research showed that English teachers implement this cognitive strategy by forming discussion groups, utilizing learning models (PJBL, PBL and direct methods) and conducting questions and answers to students. The influences of implementing this cognitive strategy are students who were initially very passive in learning English became motivated to participate in English learning after implementing this cognitive strategy. They spoke actively in expressing opinions, suggestions, creative ideas and actively collaborated. This shows that the results of the implementation of cognitive strategy have met the four indicators (critical thinking, creative thinking, decision making and problem solving). This strategy is very influential on students' learning process because it can improve students' thinking process through the application of cognitive strategies, so that students can develop their knowledge in learning.

Keywords: *Strategy, critical thinking, creative thinking, making decisions, solving problems.*

INTRODUCTION

English is used to communicate orally and in writing on a global scale; it plays a crucial part in students' intellectual, social, and emotional growth. It also supports achievement in learning across all subject areas. According to ((Kasbolah, 2001), English is the first foreign language that is considered essential for acquiring information, assimilation, advancing science, technology, art, and culture, and creating international alliances. These four skills are used to communicate and create discourse in social life. Therefore, English needs to be taught in junior high schools

because some students in junior high schools need to learn English in their elementary schools. Hence, English teachers in junior high schools have to teach basic English.

Based on the researcher's observation in class, she found that some of these students need help with organization, correctness in the use of language structure, and word choice, and they have difficulty expressing their thoughts in writing or orally. Therefore, they need help to learn English. Besides that, students needed to understand more vocabulary when writing sentences in a paragraph. They are to make oral and written to solve their problems (They cannot distinguish between present tense and past tenses, and they need more vocabulary), and they also need to improve their English pronunciation. They must know English is necessary since it is used worldwide in many facets of life, such as Education, health, technology, and society.

The researcher interviewed one of the English teachers in Junior High School. She admitted that she had difficulties teaching English because some of the students had trouble collaborating with their group mates, they were not confident when presenting the results of their assignments in front of the class, and learning in class was not differentiated, and it was not student-centered. Therefore, the teacher had yet to identify the best strategy for teaching English. So, it can be a big problem if the teacher needs to find the right teaching strategy to solve problems in teaching English. If the proper techniques are used in the classroom, the students will learn more quickly and effectively, resulting in successful outcomes.

The quality of English teaching in schools needs to be improved. A strategy is a tool that assists individuals in carrying out tasks, particularly students, who benefit from the learning process being simple and quick since they know what must be prepared. According to (Brown, 2007), a person's personality in learning is closely tied to their learning style. Students can swiftly absorb the information the teacher or speaker presents using the proper strategy. Students will be more motivated to learn different lessons since they believe they have solutions to their learning problems, which will help them better absorb the topic. The teacher's understanding of students' growth and condition impacts effective teaching strategy.

One of the teaching strategy teachers use in teaching English is the cognitive strategy. A cognitive strategy is an internal ability to help students learn, think, solve problems, and make decisions (Wahid, 2009). In this case, all learning objectives can be achieved in the cognitive, affective, and psychomotor domains. So, the students are expected to develop their English skills comprehensively and understand and apply English in everyday life, both in academic and social contexts. They are four aspect of cognitive strategy namely critical thinking, creative thinking, making decisions and solving problems. Based on the problems and definitions above, the researcher was conducted the research entitled "The Implementation of Cognitive Strategy in Teaching English at SMPN 2 Sungguminasa".

LITERATURE REVIEW

Social Cognitivism

The social cognitive theory put forward by Albert Bandura was born based on criticism of the theory developed by behaviorists. According to (Bandura & Evans, 2006), although learning principles are sufficient to explain and predict behavior, these principles must pay attention to a phenomenon that is ignored by the behaviorist paradigm, namely that humans have the ability to think and regulate their own behavior. Bandura formulated Social Learning Theory by

accommodating human cognitive abilities in thinking and learning through social observation. Bandura stated that, people learn many behaviors through the process of imitation. We can imitate some behavior simply through observing the model's behavior and the consequences it produces. This kind of learning process is called observational learning or learning through observation. During observational learning, a person tries to carry out the behavior he sees and carrying out reinforcement/punishment which functions as a source of information for someone regarding their behavior.

This social learning theory explains how a person's personality develops through the process of observation. A well-known term in social learning theory is modeling (imitation). Modeling is more than just imitation or repeats model behavior but also involves adding and/or subtracting observed behavior, generalizing various observations, while also involving cognitive processes. When implementing cognitive learning theory, a teacher needs to focus on students' thinking processes and provide appropriate strategy based on their cognitive functions (LMS, 2022) . Involve students in various activities, such as giving them time to ask questions, the opportunity to make mistakes and correct them based on observations, and self-reflection to help them understand mental processes.

Strategy Cognitive

In general, cognitive strategy can be interpreted as a cognitive procedure used to achieve cognitive goals ranging from the most intuitive, such as sensing, to the higher cognitive levels of observation, storing and remembering, imagination, and thinking. Cognitive in the world of education can be interpreted as one theory among several learning theories which understands that learning is the organization of cognitive and perceptual aspects to gain understanding (Sutarto, 2017). Thus, cognitive is a learning theory that prioritizes the learning process rather than learning outcomes. Cognitive strategy is a way that students use to learn material or gain a deep understanding of something material, with the aim of obtaining information or skills related to agency, goals and perception instruments.

According to (Gagne, 1985) states that cognitive strategy is one of the essential learning outcomes in the form of skills in organizing internal processes in approximation, understanding, remembering, recalling, and thinking". Gagne further adds that cognitive strategy is an internal activity; it may be used to control and adjust the learning process. Gagne explained that strategy create or provide a structural basis for learning. Students try to solve problems using this strategy.

According to (Surya, 2015), there are five aspects of cognitive strategy which will be explained below:

1. Critical thinking

Critical thinking is a cognitive strategy in solving problems that are more complex and require higher patterns. (Gosnell, 2010) stated that critical thinking is disciplined mental activity of making judgments that can guide the development of beliefs and taking actions. This statement is in line with (Dülger, 2012) that critical thinking is the intellectually disciplined process of actively and skillful conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from or generated by observation, experience, reflection, reasoning, or communication, as guide to belief and action.

2. Creative thinking

Creative thinking is the ability to generate new, original, and innovative ideas in problem solving, product development, art, or in various other contexts. (Ghufron, n.d.) suggest that the ability to think creatively has an important role in life because creativity is a source the power of reliable human resources to drive human progress in terms of research, development and new discoveries in the fields of science and technology as well as in all fields of human endeavor. Students who are able to think creatively will have ideas (creativity) to solve various problems (Coon et al., 2014). It can be concluded from the definitions above that creative thinking is a way to come up with internal solutions English language learning where students can develop their knowledge in English and can improve their creative thinking abilities through interesting and interactive group discussion activities so that they can develop their creative thinking abilities in completing group assignments.

3. Making decision

Decision making is a mental (cognitive) process results in practical choices among various options and ends with a final choice (Bonatti et al., 2009) Decision making is a problem-solving process that ends when a satisfactory solution is reached (Schiebener et al., 2011). In general, decision making is a mental process that involves all people humans throughout their lives (Ratcliff, et al, 2009). Decision making is a rational mental process (Abdollahi, 2005).

Decision making is a process in the brain for monitoring planning, cognitive abilities, abstract views, role acquisition, initiation of appropriate behavior, inhibition of inappropriate behavior, and helping systems. attention to select related sensory information (Szmalec et al, 2010). Decision making is a rational, acceptable mental process for solving problems and producing solutions (Schiebener et al., 2011b).

4. Problem solving

Learn to solve problems through observation occurs when someone is faced with a problem that must be looked at carefully. Problem solving is a goal that must be achieved, but the actions that must be taken to solve the problem are not yet known. According to (Annizar et al., 2020), problem-solving is a process or effort that uses all the knowledge, skills, and understanding it must find solutions to problems using a particular approach. So, problem-solving is inseparable from the knowledge and experience that has been passed before. Meanwhile, according to (Wijayanto & Santoso, 2018), problem-solving is an approach that trains students to think creatively by solving problems through predetermined stages and predetermined steps.

Based on the explanation above, it can be concluded that the researcher focuses on cognitive strategy in students' thinking processes in learning English. The thinking process in the cognitive strategy refers to a series of cognitive activities that occur when someone processes information, solves problems, makes decisions, or builds a new understanding of a topic. It involves using various cognitive skills, such as perception, attention, memory, logical thinking, and problem-solving.

METHOD

Research Design

This research used a descriptive qualitative method; qualitative research is concerned with understanding meaning. Qualitative researchers are interested in how people make sense of their world and interpret and experience different events. A qualitative research approach is used to understand social phenomena and human behavior by collecting, analyzing, and interpreting descriptive and non-numeric data. This method aims to gain a deep understanding of the experiences, perceptions, meanings, and social contexts behind the phenomena under study. According to (Atmowardoyo, 2018), descriptive research is a method used to describe phenomena as accurately as possible. The word "existing phenomenon" does descriptive research in contrast to experience cognitive research, which observes not only existing phenomena but also phenomena after a specific treatment period.

Research Subject

The participants in this research were English teachers at SMPN 2 Sungguminasa. Consists of 2 English teachers. The criteria for selecting English teachers as research subjects were English teachers with many years of teaching experience. Therefore, the researcher used a purposive sampling technique. The purposive sampling technique is one of the methods in qualitative research carried out with specific objectives. In this technique, the researcher deliberately selects participants who are considered the most relevant and representative to meet predetermined research objectives.

Research Instrument

A research instrument is a tool or method used to collect data needed to answer research questions. According to (Sugiyono, 2013) a research instrument is a tool used to measure observed natural and social phenomena. Meanwhile, according to (Kriesna et al., n.d.) stated that research instruments are basically tools used to collect internal data study. The research instrument was created in accordance with the measurement objectives and theory used as base. The researcher used three instruments in this research: observation, interviews, and documentation. In this stage, the researcher observed the process of teaching English in class using observation sheets by recording them as documentation and then conducting interviews with English teachers.

Technique of Data Analysis

In analyzing data from class observations and interviews, researchers used qualitative data analysis based on (Miles & Huberman, 1994)theory, which consists of four stages: data collection, data presentation, data condensation, and conclusion.

FINDINGS

Research findings provide information found by researchers through research instruments. Because there are two research questions, this chapter requires two main points of research findings and two main points of research discussion. The research objects were two English

teachers with experience teaching English in junior high schools. The data that has been collected is in the form of interviews, observations and documentation that produce transcripts.

Teacher's implementation of cognitive strategy in teaching English

According to T 1, She implemented cognitive strategy using the direct method, PBL and PJBL. Meanwhile, according to T2, she implements cognitive strategy by forming discussion groups, giving group assignments and formulating questions that can stimulate students' deep understanding of English.

Extract 1

T1: *"Ada tiga metode yang sering saya gunakan di kelas. Dua di antaranya sudah saya sebutkan tadi (Metode Langsung dan Pembelajaran Berbasis Masalah). Selain itu, jika memungkinkan, saya juga menggunakan metode pembelajaran berbasis proyek di kelas. Ketiga metode ini merupakan upaya saya untuk meningkatkan kemampuan bahasa Inggris peserta didik".*

"There are three methods that I often use in the classroom. Two of them I mentioned earlier (Direct Method and Problem-Based Learning). In addition, if possible, I also use the project-based learning method in the classroom. These three methods are my efforts to improve learners' English language skills".

Interview with teacher 1

Extract 2

T2: *"Untuk meningkatkan kemampuan berpikir siswa seperti berpikir kritis, kolaborasi dan refleksi dalam pembelajaran bahasa Inggris, saya sering menerapkan strategi kognitif dengan membentuk kelompok diskusi, memberikan tugas kelompok dan merumuskan pertanyaan-pertanyaan yang merangsang pemahaman yang mendalam terkait bahasa Inggris. Dengan melibatkan siswa dalam berpikir kritis, kolaborasi dan refleksi, strategi kognitif ini telah membantu secara signifikan meningkatkan keterampilan berpikir siswa dalam pembelajaran bahasa Inggris".*

"To improve students' thinking skills such as critical thinking, collaboration and reflection in English learning, I often apply cognitive strategy by forming discussion groups, giving group assignments and formulating questions that stimulate deep understanding related to English. By engaging students in critical thinking, collaboration and reflection, these cognitive-strategy have helped significantly improve students' thinking skills in English learning".

Interview with Teacher 2

From the extract above, both teachers have implemented cognitive strategy in teaching English differently depending on their classroom conditions. The first teacher uses three methods (PBL, PJBL & Direct method) to implement this cognitive strategy, while the second teacher implemented cognitive strategy by forming discussion groups. It can help students actively discuss and collaborate so that it can improve their thinking process through the implementation of cognitive strategy.

The influence of implementing cognitive strategy on students' English learning process.

The results of the interview showed a significant change both in terms of student involvement and motivation in learning. Then, the researcher also described the interview results based on aspects/indicators of cognitive strategy, namely critical thinking, creative thinking, making decisions and problem-solving in improving students' thinking processes.

Changes that occur significantly after and before the implementation of cognitive strategy.

Extract 3

T1: "Jika saya bandingkan dengan hanya menjelaskan tata bahasa dasar dan menjawab pertanyaan, penerapan strategi kognitif dalam pembelajaran memberikan dampak positif bagi siswa. Saya telah menggunakan metode pembelajaran berbasis masalah saat mengajarkan materi "mendeskripsikan orang". Saya menjelaskan kepada siswa mengapa penting untuk dapat mendeskripsikan seseorang kepada orang lain. Saya memberikan contoh situasi di tempat wisata yang sering dikunjungi turis asing di mana kita harus berkomunikasi dengan mereka dalam bahasa Inggris. Siswa diberikan pemahaman tentang bagaimana bertanya kepada orang asing tentang seseorang yang mereka cari. Selanjutnya, kami membahas pola kalimat yang digunakan dalam mendeskripsikan seseorang. Siswa diberikan daftar kosakata kata sifat yang harus mereka pahami untuk mendukung pembelajaran ini. Lembar kerja yang dirancang sesuai dengan tujuan pembelajaran memungkinkan siswa untuk menulis teks deskriptif yang menunjukkan kebanggaan terhadap seseorang dengan sifat-sifat positif yang sesuai dengan penggunaannya. Pendekatan ini tentu saja meningkatkan motivasi siswa untuk belajar kosakata kata sifat".

" If I compare it to simply explaining basic grammar and answering questions, implementing cognitive strategy in learning positively impacts students. I have used the problem-based learning method when teaching the material "describing people." I explain to students why it is important to be able to describe a person to others. I give an example of a situation in a tourist spot frequented by foreign tourists where we must communicate with them in English. Students are given an understanding of how to ask strangers about someone they are looking for. Next, we discuss sentence patterns used in describing a person. Students are given a vocabulary list of adjectives they must understand to support this learning. Worksheets designed according to learning objectives allow students to write descriptive texts that show pride in someone with positive traits appropriate to their use. This approach certainly increases students' motivation to learn adjective vocabulary".

Interview with teacher 1

Extract 4

T2: "Dalam pengamatan saya di kelas, saya melihat bahwa pada awalnya siswa pasif dalam pembelajaran, hanya menjawab pertanyaan dan kurang aktif dalam diskusi. Setelah saya menerapkan strategi kognitif, terjadi perubahan yang signifikan. Siswa menjadi lebih berani berbicara, aktif dalam diskusi kelompok, dan terlibat dalam pemikiran yang mendalam. Mereka tidak hanya berbagi ide, tetapi juga antusias dalam bertukar pendapat. Kemampuan komunikasi lisan siswa pun meningkat, terlihat dari kemampuan mereka dalam merumuskan argumen dan menyampaikan ide dengan lebih terampil".

"In my observations in class, I noticed that initially, the students were passive in learning, only answering questions and being less active in discussions. After I implemented the cognitive strategy, significant changes occurred. Students become more courageous in speaking, active in group discussions, and involved in deep thinking. They not only share ideas but also enthusiastically exchange views. The students' oral communication skills improved, as seen from their ability to formulate arguments and convey ideas more skillfully".

Interview with Teacher 2

Based on the extract above, the researcher found that students are more active in the involvement of the English learning process both individually and in groups after implementing this cognitive strategy. They can develop their thinking process by learning "describing people" vocabulary traits, exchanging ideas, actively speaking and discussing in groups.

Improvement in learning motivation and student involvement in learning English

Extract 5

T1: " Pada suatu semester yang lalu, saya mencoba merefleksikan pembelajaran di akhir pembelajaran dengan para siswa. Meskipun singkat, dengan jumlah anak yang hanya sedikit, para siswa merasa pembelajaran saya cukup menarik. Mereka juga terlihat antusias mengikuti berbagai kegiatan selama proses pembelajaran. Hasil penilaian kognitif yang saya berikan pada setiap siklus juga menunjukkan hasil yang cukup karena siswa mendapat nilai yang sama di atas 80".

"One last semester, I tried to reflect on learning at the end of learning with students. Even though it was short, with only a few children, the students felt that my learning was quite interesting. They also seemed enthusiastic about participating in various activities during the learning process. The cognitive assessment results I gave in each cycle also showed sufficient results because students got the same score above 80".

Interview with teacher 1

Extract 6

T2: "Ya, para siswa terlihat antusias dalam proses pembelajaran di kelas, berarti mereka memiliki motivasi belajar yang baik".

" Yes, the students look enthusiastic in the learning process in class, it means they have good learning motivation".

Interview with teacher 2

Based on the extract above, the researcher found increased students' motivation and involvement in learning English. Students are very enthusiastic and active in participating in language learning. Students are more motivated to follow English learning after the teacher implements this cognitive strategy. It can be seen from their learning results that they get scores above 80.

Aspect of cognitive strategy

According to (Surya, 2015) cognitive strategy has four aspects: critical thinking, creative thinking, decision-making, and problem-solving. The four aspects become a reference in cognitive strategy to find out how the students' thinking process during the implementation of cognitive strategy in learning English. The following are the findings of researchers in the cognitive aspect below:

1. Critical thinking

Extract 7

T1: "Selama saya menerapkan strategi kognitif ini, siswa dapat mengembangkan kemampuan berpikir kritis mereka, seperti, beberapa siswa dapat menjawab dengan kritis "pertanyaan pancingan" yang saya berikan, kemudian mereka juga dapat menjawab pertanyaan esai dengan kritis terkait materi teks naratif. Dengan meningkatkan kemampuan berpikir kritis siswa, mereka dapat menganalisis dan mengidentifikasi masalah yang berkaitan dengan materi pembelajaran".

"As long as I implement this cognitive strategy, students can develop their critical thinking skills, such as, some students can answer critically the "sparking questions" that I give, then they can also answer essay questions critically related to narrative text material. Improving students' critical thinking allows them to analyze and identify problems related to learning materials."

Interview with teacher 1

Extract 8

T2: "Menurut saya, ada pengaruhnya selama saya menerapkan strategi kognitif ini meskipun hanya empat siswa yang mengalami peningkatan karena saya mengajar di kelas 7 SMP, dan mereka perlu mengasah kemampuan mereka dalam berpikir kritis. Selain itu, beberapa masih kurang dalam bahasa Inggris, jadi hanya sedikit siswa yang mengalami pengaruh ini. Siswa yang mengalami peningkatan dalam berpikir kritis mereka aktif menjawab pertanyaan-pertanyaan kritis dan dapat memberikan alasan yang logis, kemudian mereka dapat berdiskusi dalam kelompok dengan mengemukakan pendapat dan idenya dalam mengerjakan lembar kerja kelompok".

"In my opinion, there was an influence as long as I implemented this cognitive strategy even though only four students experienced an increase because I teach in grade 7 junior high school, and they need to hone their skills in thinking critically. Moreover, some are still lacking in English, so Few students experience this influence. Students who experience an increase in critical thinking they actively answer critical questions and can provide logical reasons, then they can discuss in groups by expressing their opinions and ideas in working on group worksheets".

Interview with Teacher 2

Based on the extract above, after the two teachers implemented cognitive strategy. Students actively expressed their ideas and opinions critically in answering questions, group discussions and working on LKPD in English learning process. Although only a few of their students could think critically, their students were still active in following the learning process.

2. Creative thinking

Extract 9

T1: "Saat itu saya mengarahkan mereka untuk membentuk kelompok yang terdiri dari 6 orang untuk membuat majalah dinding dengan materi agreement & disagreement. Pada pertemuan ini, mereka mendiskusikan tema dan konsepnya. Walaupun hasilnya akan terlihat pada pertemuan kedua, namun ketika mereka mempresentasikan hasil diskusinya, terlihat bahwa mereka kreatif dalam mendiskusikan tema dan konsep majalah dinding mereka. Mereka sudah mengetahui arah dari tugas ini. Strategi kognitif ini sangat baik karena memungkinkan siswa untuk mengembangkan ide-ide kreatif."

"When I directed them to form a group of 6 people to make a wall magazine on agreement & disagreement material. At this meeting, they discussed the theme and concept. Although the results will be seen at the second meeting, when they presented the results of their discussion, it was seen that they were creative in discussing the themes and concepts of their bulletin. They already know the direction of this task. This cognitive strategy is very good because it allows students to develop creative ideas."

Interview with teacher 1

Extract 10

T2: "Menurut saya, pengaruh strategi kognitif ini sangat berdampak pada hasil pemikiran kreatif mereka; selama saya menerapkan strategi ini, saya memberikan tugas yang menantang yang mendorong siswa untuk menemukan solusi kreatif. Saya menyampaikan materi perkenalan diri saat membentuk kelompok (bekerja berpasangan). Saya memberikan kebebasan kepada mereka untuk berdiskusi dan mempresentasikan percakapan tersebut secara kreatif di depan kelas dengan percaya diri. Setelah menerapkan strategi kognitif ini, siswa menjadi lebih aktif dalam berdiskusi dan dapat memberikan kontribusi serta mengekspresikan ide-ide kreatif mereka dalam belajar bahasa Inggris, terutama ketika menyelesaikan tugas individu atau kelompok"

"In my opinion, the influence of this cognitive strategy greatly impacts the results of their creative thinking; as long as I implement this strategy, I give challenging assignments that encourage students to find creative solutions. I converse on self-introduction material when I form groups (work in pairs). I give them the freedom to discuss and present the conversation creatively in front of the class confidently. After implementing this cognitive strategy, students become more active in discussions and can contribute and express their creative ideas in learning English, especially when completing individual or group assignments"

Interview with Teacher 2

Based on the extract above, the researcher concluded that in developing students' creative thinking skills, both English teachers formed discussion groups to develop their creative ideas. They actively discuss with their groups, and the teacher gives them the freedom to determine the topic, theme and concept of the assignment given by the teacher.

3. Making decision

Extract 11

T1: "Menurut saya, ada pengaruh selama menerapkan strategi kognitif ini. Saya menemukan bahwa siswa dapat menentukan struktur atau kosa kata yang tepat dalam membuat

percakapan pada materi agreement & disagreement. Selain itu, mereka juga dapat menentukan tema/konsep percakapan sehingga dapat bertukar pendapat dan memecahkan masalah sehingga siswa dapat mengambil keputusan yang tepat".

"In my opinion, there is an influence during implementing this cognitive strategy. I found that students can determine the right structure or vocabulary in making conversations on agreement & disagreement material. In addition, they can also determine the theme/concept of the conversation so that they can exchange opinions and solve problems so that students can make the right decision".

Interview with teacher 1

Extract 12

T2: "Ketika saya memberikan tugas kelompok, siswa dapat mengambil keputusan. Misalnya, mereka bisa menentukan ketua kelompok, tema/konsep yang akan dibahas, dan tugas masing-masing anggota. Strategi ini sangat cocok untuk diterapkan di kelas, khususnya pengajaran bahasa Inggris, karena dapat membantu meningkatkan pemahaman siswa dalam menentukan keputusan yang tepat".

"When I give group assignments, students can make decisions. For example, they can determine the group leader, the theme/concept to be discussed, and each member's task. This strategy is very suitable for implementation in the classroom, especially English teaching, because it can help improve students' understanding in determining the right decision".

Interview with Teacher 2

Based on the extract above, this cognitive strategy can help students make decisions. Based on observation, the researcher found that students were more active in expressing their ideas or findings in completing the task. According to T1, students could determine the use of appropriate structures and vocabulary in conversations, while in T2, students could evaluate the theme/concept and group members.

4. Problem solving

Extract 13

T1: "Ya, strategi ini cukup membantu siswa dalam memecahkan masalah. Ketika saya memberikan contoh kasus kepada mereka tentang persetujuan dan kesepakatan, beberapa dari mereka aktif mengungkapkan pendapatnya untuk memecahkan masalah dari kasus tersebut. Tapi hanya lima orang yang bisa menyelesaikan masalah tersebut. Mungkin saya harus lebih banyak melakukan pendekatan kepada siswa agar mereka dapat memecahkan masalah dalam pembelajaran".

"Yes, this strategy can quite help students solve problems. When I gave examples of cases to them regarding agreement and agreement, some of them actively expressed their opinion to solve the problem of that case. But only five people can solve the problem. Maybe I need to approach students more so they can solve problems in their learning".

Interview with teacher 1

Extract 14

T2: "Ya, benar, strategi ini membantu siswa memecahkan masalah dalam pembelajaran mereka. Terutama dalam diskusi kelompok, mereka dapat memecahkan masalah dalam menyelesaikan tugas. Kemudian, saya memberikan pertanyaan-pertanyaan rangsangan yang dapat mendorong siswa untuk berpikir memecahkan masalah tersebut. Meskipun tidak semua siswa dapat menjawabnya, mereka tetap mendengarkan jawaban dari teman dan gurunya".

"Yes, that's right, this strategy helps students solve problems in their learning. Especially in group discussions, they can solve problems in completing tasks. Then, I give stimulating questions that can encourage students to think about solving these problems. Even though not all students can answer them, they still listen to the answers of their friends and teachers".

Interview with Teacher 2

Based on the extract above, the researcher concluded that the two English teachers said that cognitive strategy were enough to help students solve problems in learning, but only a few were able to solve the problem even though the teacher had tried to encourage students to think in finding solutions, but some students did not understand it. Even so, students who do not understand still actively listen to their friends' and teachers' answers and explanations.

DISCUSSIONS

The interpretation of findings from the descriptive research, which includes data from interviews and observations, will be discussed in this section. The implementation of cognitive strategy in English language teaching at SMPN 2 the researcher will address Sungguminasa in this research.

Implementation cognitive strategy in teaching English

To create a comprehensive and dynamic learning environment, I consistently draw upon three teaching methods that I find particularly effective in the classroom. These methods have been instructional in fostering a more engaging and enriching educational experience for my students, ultimately contributing to their proficiency in the English language. The two methods I previously mentioned, namely the Direct Method and Problem-Based Learning, have consistently demonstrated their value in facilitating students' language acquisition and problem-solving skills. The Direct Method, emphasizing immersion and contextual understanding, has proven to be a powerful tool in helping students grasp the nuances of the language more intuitively. Problem-based learning, on the other hand, encourages students to apply their knowledge in practical scenarios, promoting critical thinking and analytical skills essential for effective English communication. According to (Sutarsa & Puspitasari, 2021) they were stated, Problem-based learning (PBL), at its most fundamental cognitive level, is an instructional method characterized by the use of „real world“ problems as a context for students to learn critical thinking and problem-solving skills, and acquire knowledge of the essential concept of the course.

Additionally, integrating project-based learning further enhances the learning journey by providing students with hands-on opportunities to apply their language skills in real-world contexts. This method nurtures creativity and collaboration and reinforces the practical relevance of language acquisition, motivating students to explore the language with a sense of purpose and

curiosity. Recognizing the importance of fostering holistic development, I have also endeavored to nurture students' higher-order thinking skills. I actively employ cognitive strategy that promote critical thinking, collaboration, and reflection within English language learning to achieve this. I create an environment encouraging students to explore the language from multiple angles by forming discussion groups, assigning collaborative tasks, and posing thought-provoking questions. Forming discussion groups promotes active learning by building discussions in small groups to develop students' knowledge, skills, and professionalism (Grijpma et al., 2021). As a result, students develop a deeper understanding of English and cultivate essential cognitive skills that extend beyond the classroom.

In summation, integrating these three distinct teaching methods—Direct Method, Problem-Based Learning, and project-based learning—alongside implementing cognitive strategy collectively exemplifies my commitment to fostering a holistic approach to language learning. Through these approaches, I aspire to empower my students with the tools they need to excel in their English language proficiency and to develop into critical thinkers, effective communicators, and well-rounded individuals.

The influences of implementing cognitive strategy on students' English learning process

a. Changes that occur significantly after and before the implementation of cognitive strategy.

Compared to simply explaining basic grammar and answering questions, implementing cognitive strategy in the learning process has a positive and far-reaching impact on learners' development. I have adopted a problem-based learning method when teaching "describing people" in this context. In this process, I carefully detail to students why having the ability to describe a person clearly to others has an inevitable importance. I give an example of a situation at a tourist attraction frequented by foreign travelers, where the need to communicate with them in English becomes a key part of the interaction experience. Through this example, students can understand how to ask a stranger for information about someone they don't know.

The next step in this learning journey is to explore various sentence patterns used to describe individuals comprehensively. To support this teaching, students are introduced to a vocabulary list of adjectives that can enrich their language. The worksheet, carefully designed in line with the learning objectives, allows students to express their ideas through descriptive writing that reflects an appreciation of the individual and displays positive traits that are interrelated and appropriate to the situation under discussion.

Our approach positively affects students' learning motivation, especially in understanding adjective vocabulary. Cognitive psychology emphasizes that learning is not just cognition but also the motivational aspects and belief systems in learning. Student motivation and the degree of student confidence in the learning process are important factors in learning. Therefore, it is necessary to foster students' motivation and build their trust in the learning process. The observations I made in the classroom environment highlighted a real development. In the early stages, students tended to be passive in the learning process, only answering the questions with minimal involvement in deeper debate.

However, with the implementation of cognitive strategy, significant changes surfaced. Previous research (Hasanuddin, 2005) found that implementing cognitive processes in learning English positively and significantly improves students' English-speaking skills. The researcher

experienced this during the observation and interview of the English teacher. Students showed courage to speak more actively; they were more enthusiastic in participating in group discussions that stimulated deep thinking. In this scope, students exchange ideas and eagerly exchange views. Students' oral communication skills also improved markedly, reflected in their skills in constructing arguments and conveying ideas more skillfully.

In addition, students began to show initiative in formulating deeper questions and searching for additional information to improve their understanding of the studied topic. This improvement reflects the strengthening of critical thinking skills. Students can process information more deeply, make conclusions based on relevant evidence, and evaluate information more carefully. When participating in group discussions, students also learned to hone their active listening skills, support classmates' views, and work together to achieve deeper understanding. In addition, improvements in students' self-confidence are also evident, according to (Muslimah et al., 2023). Self-confidence is an individual's positive attitude that enables him to develop a positive assessment of himself and the environment or situation he faces reflecting the success of a holistic learning approach that stimulates cognitive and interpersonal skills.

b. Improvement in learning motivation and student involvement in learning English

In the most recent semester, I tried to foster a reflective atmosphere, encouraging students to contemplate their learning journey as it drew close. Despite the brevity of the exercise and the limited number of participants, the resonance it struck among the students was palpable. The educational voyage they had embarked upon under my guidance had left an indelible mark, casting an aura of interest and curiosity around the subject matter. The students exhibited a contagious enthusiasm throughout their learning expedition, eagerly immersing themselves in various carefully curated activities. This vitality that emanated from them was indeed heartening, serving as a testament to the dynamic nature of the learning experiences I had endeavored to craft. Witnessing their involvement and dedication was inspiring and fulfilling as they actively navigated a series of engaging tasks and challenges.

Motivation and cognitive learning strategy are components of the learning process, which are interconnected and affect learning achievement (Anais et al., 2012). Psychologists such as Alexander et al. (Slavin, 2012) define motivation as an internal process that activates, directs, and escorts behavior to reach a goal. According to (Ormrod et al., 2016), students who have learning motivation will 1) direct their behavior towards a specific goal, 2) increase effort and energy, and 3) increase initiation and persistence in learning.

The culmination of each learning cycle was marked by a cognitive assessment that I administered to gauge their grasp of the material. The outcomes of these assessments consistently unveiled promising results, underscoring the students' commendable level of comprehension and mastery. Across the board, their scores always surpassed the threshold of 80, affirming their solid grounding in the subject matter and their capacity to assimilate complex concepts. (Briggs, 1983) provides an understanding of learning outcomes: all the skills and results obtained through teaching and learning activities at school, expressed by numbers and values sourced from tests measuring learning outcomes.

Beyond the quantitative metrics, an undeniable energy infused the classroom throughout the learning process. The vibrancy that enveloped their interactions and engagements attested to their genuine excitement for the learning endeavor. This dynamic atmosphere was, in essence, a

reflection of their intrinsic motivation to delve into the subject matter, comprehend its nuances, and actively participate in discussions and activities.

In conclusion, the students' enthusiasm and active participation throughout the learning process testify to their profound motivation to excel. Their palpable eagerness to engage with the material underscores the efficacy of a dynamic and interactive pedagogical approach, ultimately creating an environment where learning becomes a fulfilling and captivating pursuit.

c. Aspect of cognitive strategy

1. Critical Thinking

Critical thinking is the ability to know a problem more deeply and find solutions to a problem. Critical thinking is also a way to analyze an argument and develop insight (Kartimi & Liliyasi, 2012). Necessary thinking skills need to be integrated with learning as a goal of the learning process because it can provide experience to compete in the future (Rachmawati & Rohaeti, 2017).

By consistently integrating this cognitive strategy into the instructional framework, students are afforded a platform to nurture and hone their critical thinking proficiencies. This becomes evident as several students confidently and adeptly respond to the thought-provoking "sparking questions" I pose, demonstrating their capacity to dissect and engage with complex concepts. Moreover, their understanding extends to tackling essay questions tied to narrative text material, where their responses exhibit a discerning and analytical approach.

The noticeable enhancement in students' critical thinking competence bears testament to their burgeoning ability to dissect, scrutinize, and pinpoint issues intrinsic to the learning materials. This burgeoning adeptness empowers them to meticulously analyses information, detect potential stumbling blocks, and synthesize insights that further their comprehension. (Perkins & Murphy, 2006), suggests that learning to think critically about information is to make choices with the support of appropriate data. Thus, in the learning process, students must continue to be assisted in developing critical thinking patterns using adequate information.

From my vantage point, introducing this cognitive strategy undeniably exerts a discernible influence on the learning landscape, even though the scope of its impact is more pronounced among a subset of students. Given my context of teaching seventh-grade students in junior high school, refining critical thinking skills, particularly within English language learning, is paramount. This endeavor is particularly crucial considering the varying degrees of English proficiency among the students, and thus, the extent of the influence tends to be more concentrated. Critical thinking skills are essential for students as they are considered to be the distinguishing feature of an educated person and a condition for becoming an active worker and global citizen (Facione et al., 1994). However, critical thinking is a basic necessity for all students at certain stages of education, such as university education. The complexities of its development need to be addressed from the early education stages (van der Zanden et al., 2018).

The students who have witnessed the transformation in their critical thinking faculties now actively participate by cogently addressing intricate queries, bolstering their responses with compelling and logical rationale. The blossoming of their critical thinking is not confined to individual endeavors but also their collaborative group discussions. They enthusiastically elucidate their viewpoints, articulate their notions, and foster a lively exchange of ideas. This

collaborative dynamic becomes even more manifest as they cooperatively navigate group worksheets, harmonizing their cognitive prowess to unravel complex tasks. In summation, the pervasive influence of integrating this cognitive strategy transcends the limitations of its application, as a subset of students experience a noticeable elevation in their critical thinking prowess. This elevation is echoed in their ability to dissect questions, formulate intelligent responses, and cultivate an adeptness for collaborative discourse. Through this pedagogical approach, the seeds of critical thinking are sown, fostering a generation of students empowered with cognitive agility and analytical insight.

2. Creative Thinking

(Ghufron, n.d.) suggest that the ability to think creatively has an important role in life because creativity is a reliable source of human resource strength to drive human progress in terms of search, development, and discoveries in the fields of science and technology as well as in all areas of human endeavor. Creative thinking is very important to be developed in the world of education. Therefore, teachers need to help and facilitate students to think creatively so that they can create new things. This is in line with what English teachers do in English learning process to improve students' creative thinking skills.

When I directed them to form groups of 6, the aim was for them to work together to create a bulletin covering agreement and disagreement. At the first meeting, they focused on discussing the theme and concept that would be used as the basis for the wall magazine. Although the final result will only be seen in the second meeting, when they presented the results of their discussion, it was clear how creative they were in processing the theme and concept of the wall magazine. (Santrock, 2018) defines creative thinking as thinking about things in new and unusual ways and producing unique solutions to problems. In line with Santrock, Sternberg (2003: 325-326) defines creative thinking as new thinking that makes valuable ideas. (Moeller et al., 2013) also state that creative thinking includes brainstorming, creating new and useful ideas, elaborating, refining, analyzing and evaluating.

In line with that, they already had a clear understanding of the direction of this assignment. This cognitive approach has significant benefits because it allows students to hone and develop creative ideas. The implementation of this strategy has a great influence on students' creative thinking ability. Along with the performance of this strategy, I constantly provide challenging tasks that encourage students to seek creative solutions, thus helping them develop innovative thinking skills.

In addition, when I formed working groups in pairs to discuss self-introduction material, I allowed them to discuss and present the conversations with creative approaches in front of the class. Their confidence was evident in their delivery of the material. The positive impact of using this cognitive strategy is increasingly visible, where students are more active in discussions and able to make valuable contributions and express their creative ideas in English learning, especially when faced with individual and group tasks.

Overall, the implementation of these cognitive strategy has brought about positive changes in students' learning styles, awakened their creative potential, and enabled them to face challenges with more confidence in English learning.

3. Making Decision

According to (Lunenburg, 2010), decision-making is choosing from several alternatives to achieve a desired outcome. This definition has three key elements. Firstly, decision-making involves choosing from several options. Second, decision-making is a process that involves more than just a final choice from among alternatives. Third, the "desired outcome" mentioned in the definition consists of a goal or target resulting from the decision maker's cognitive activity to reach the final decision. From my experience, implementing this cognitive strategy has a significant impact. I saw that students could correctly determine the appropriate structure and vocabulary when they engaged in conversations on the subject of agreement and disagreement. This ability impacted their language proficiency and ability to express their opinions clearly and structured.

Furthermore, they were also able to identify relevant themes or concepts to be discussed in the conversation. This ability allows them to interact more effectively, exchange opinions, and even be able to formulate solutions to various problems that arise jointly. It is in line with Delazer et al., 2011, which states that decision-making is a problem-solving process that ends when a satisfactory solution is reached. I saw students learn to speak, have meaningful discussions, and find answers to make smart decisions in complex situations.

I have witnessed how students can take responsibility well when assigning group tasks. They not only appoint a group leader but are also able to jointly formulate a theme or concept to be covered in the discussion. In addition, they can distribute tasks fairly among group members, showing balanced collaboration and responsibility in group work. This cognitive strategy is very suitable to be applied in English teaching, especially since this subject requires good communication skills and the ability to make the right decisions. Using this strategy helps students improve their understanding of making informed and effective decisions, a valuable skill they will carry with them in various aspects of their lives in the future.

When students are faced with problems in their learning, they can make decisions quickly and without hesitation in the learning process because decision-making is a psychological and cognitive process to determine actions as a means of solving problems quickly and without delay (Bonatti, et al, 2009). The decision-making process is defined as a process of selecting from a variety of possible action options to be selected and then carried out, where the desired action is expected to produce the best decision among others (Paradis et al., 2016 By determining the right decision in learning, students will successfully achieve their learning goals.

4. Problem-Solving

According to (Surya, 2015), problem-solving is a cognitive strategy needed in carrying out life tasks that must face various difficulties ranging from the simplest to the most complex. In the context of learning, problem-solving is one strategy that can help learning processes and outcomes.

This cognitive strategy is proven to help students overcome challenges and problems in their learning because the purpose of this cognitive strategy is to gain a deep understanding of the material being studied, and students use this strategy to solve certain learning problems in certain situations and conditions to gain knowledge and intelligence. (Murayama et al., 2013)

When I gave case, examples related to agree and disagree problems, I saw that some students actively expressed their opinions to formulate solutions to the issues presented.

However, out of the whole class, only five students found a solution to the case. Additional steps are needed to approach students more effectively so that they can all achieve a deeper understanding of problem-solving in the context of learning.

This cognitive strategy has a real positive impact in helping students solve various problems that arise, which also helps students think creatively in their learning. Solving problems can train students to think creatively by solving problems through predetermined stages or steps (Wijayanto & Santoso, 2018). Particularly in group discussions, I have seen how students successfully collaborate to formulate a solution to a given task. However, to ensure that all students could participate fully, I took it a step further by presenting essential questions designed to encourage them to think more deeply when faced with challenges. Although not all students could answer the questions, I was happy to see them still listening to their classmates' answers and my guidance.

Thus, this strategy not only provides an opportunity for students to develop problem-solving skills but also provides an inclusive environment where they can learn from each other and shape students' creativity in their learning. Practicing problem-solving skills can improve one's cognitive abilities. This is supported by (Damayanti et al., n.d.) who states that cognitive skills and creativity in solving problems will increase if children are accustomed to practicing their problem-solving skills. By adjusting the approach and providing extra support to students who may need further assistance, this strategy will continue to enrich the learning process and produce more optimal results in the future.

CONCLUSIONS

1. Implementing cognitive strategy in teaching English

Teachers implemented these cognitive strategies through several methods, such as direct method, PBL, PJBL and forming discussion groups. Those are useful to help students in the thinking process through group discussion, task presentation and answering questions from the teacher. The result is that students are actively involved in following the learning process. This means their motivation increases after implementing cognitive strategy. This cognitive strategy also makes it easier for teachers to teach where teachers can find out the ability level of students, evaluate learning outcomes, be able to help teachers in self-reflection and their students and facilitate students in their learning achievements.

2. The influences of cognitive strategy on students' English learning process.

The students are more active in speaking to express their opinions critically and provide logical reasons in answering questions and group discussions; they can also express their creative ideas by making a "wall magazine" as a group. Then, students can determine the right decisions in completing assignments on the LKPD. This is proven when students can choose the appropriate structure and vocabulary in making a conversation; then, they can determine the theme and concept of the conversation. The students can solve problems in their learning where they can answer essential questions that contain "case" elements by providing logical solutions and reasons. Even though only a few students solved this problem but did not make other students fall behind, they still actively listened to their friends' and teachers' answers and explanations. Implementing this cognitive strategy has a positive impact on the process of

teaching and learning English in a critically creative, decision-making and problem-solving manner. Then, they can also collaborate, interact with the classroom environment, and express their opinions and ideas individually or in groups. This can improve students' understanding of English learning materials so that students can successfully achieve learning objectives.

REFERENCES

- Anais, M. J., Hojas, A. M., Bustos, A., Letelier, C., Zuzulich, M. S., Cabieses, B., & Zubiaguirre, M. (2012). Motivational and cognitive learning strategies used by first-year engineering undergraduate students at Universidad Católica in Chile. *Creative Education*, 3(06), 811.
- Annizar, A. M., Jakaria, M. H. D., Mukhlis, M., & Apriyono, F. (2020). Problem solving analysis of rational inequality based on IDEAL model. *Journal of Physics: Conference Series*, 1465(1), 012033.
- Atmowardoyo, H. (2018). Research methods in TEFL studies: Descriptive research, case study, error analysis, and R & D. *Journal of Language Teaching and Research*, 9(1), 197–204.
- Bandura, A., & Evans, R. I. (2006). *Albert Bandura*. Insight Media.
- Bonatti, E., Kuchukhidze, G., Zamarian, L., Trinka, E., Bodner, T., Benke, T., & Delazer, M. (2009). Decision making in ambiguous and risky situations after unilateral temporal lobe epilepsy surgery. *Epilepsy & Behavior*, 14(4), 665–673.
- Briggs, L. J. (1983). Contributions of Cagné and Briggs to a Prescriptive Model of Instruction. *Instructional Design Theories and Models: An Overview of Their Current Status*, 75.
- Brown, E. (2007). *The Use of Learning Styles in Adaptive Hypermedia*.
- Coon, D., Mitterer, J. O., Brown, P., Malik, R., & McKenzie, S. (2014). *Psychology: A Journey (4th Canadian ed)*. Nelson Education Ltd.
- Dülger, O. (2012). Brain dominance and language learning strategy usage of Turkish EFL learners. *Cognitive Philology*, 5.
- Facione, N. C., Facione, P. A., & Sanchez, C. A. (1994). Critical thinking disposition as a measure of competent clinical judgment: The development of the California Critical Thinking Disposition Inventory. In *Journal of Nursing education* (Vol. 33, Issue 8, pp. 345–350). SLACK Incorporated Thorofare, NJ.
- Gagne, E. D. (1985). *Cognitive psychology of school learning*.
- Ghufron, N. R. (n.d.). RS 2014. *Teori-Teori Psikologi*. Yogyakarta: Ar-Ruzz Media.
- Gosnell, S. (2010). *Teaching and assessing critical thinking in radiologic technology students*.
- Grijpma, J. W., de la Croix, A., Kleinveld, J. H., Meeter, M., & Kusurkar, R. A. (2021). Appreciating small-group active learning: What do medical students want, and why? A Q-methodology study. *Medical Teacher*, 43(4), 411–420.
- Hasanuddin. (2005). Strategi Belajar Kognitif dalam Pengembangan Kemampuan Berbicara

Bahasa Inggris. *Journal Pendidikan Dan Kebudayaan*.

- Kartimi, K., & Liliyasi, L. (2012). Pengembangan alat ukur berpikir kritis pada konsep termokimia untuk siswa sma peringkat atas dan menengah. *Jurnal Pendidikan IPA Indonesia*, 1(1), 122852.
- Kasbolah, K. (2001). *Foreign Language Teaching Media*. Malang: Universitas Negeri Malang.
- Kriesna, O. :, Purwanto, K., & Pd, M. (n.d.). *PERTUMBUHAN DAN PERKEMBANGAN INDIVIDU*.
- LMS. (2022). Eksplorasi Konsep Teori belajar Topik 1. *Pemahaman Tentang Peserta Didik Dan Pembelajaran Nya*.
- Lunenburg, F. C. (2010). Group decision making. *National Forum of Teacher Education Journal*, 20(3), 1–7.
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*. sage.
- Moeller, M., Cutler, K., Fiedler, D., & Weier, L. (2013). Visual thinking strategies= creative and critical thinking. *Phi Delta Kappan*, 95(3), 56–60.
- Murayama, K., Pekrun, R., Lichtenfeld, S., & vom Hofe, R. (2013). Predicting Long-Term Growth in Students' Mathematics Achievement: The Unique Contributions of Motivation and Cognitive Strategies. *Child Development*, 84(4), 1475–1490.
<https://doi.org/10.1111/cdev.12036>
- Muslimah, A., Nasrullah, A., Putri, A., Dzakiroh, F., Fatimah, F., & Ratnasari, S. (2023). THE EFFECTIVENESS OF ARTICULATE STORYLINE ON PROBLEM-SOLVING ABILITY AND STUDENT SELF-CONFIDENCE. *Indonesian Journal of Teaching and Learning (INTEL)*, 2(3), 445–462.
- Ormrod, J. E., Anderman, E. M., & Anderman, L. H. (2016). *Educational psychology: Developing learners*. Pearson.
- Pendidikan, K., Teknologi, D., Standar, B., Asesmen Pendidikan, D., & Perbukuan, P. (n.d.). *SMP/MTs KELAS VII Ika Lestari Damayanti, dkk. 2022 ENGLISH FOR NUSANTARA*.
- Perkins, C., & Murphy, E. (2006). Identifying and measuring individual engagement in critical thinking in online discussions: An exploratory case study. *Journal of Educational Technology & Society*, 9(1), 298–307.
- Santrock, J. W. (2018). *Educational psychology*. McGraw-Hill Education.
- Schiebener, J., Zamarian, L., Delazer, M., & Brand, M. (2011). Executive functions, categorization of probabilities, and learning from feedback: what does really matter for decision making under explicit risk conditions? *Journal of Clinical and Experimental Neuropsychology*, 33(9), 1025–1039.
- Slavin, R. E. (2012). Cooperative learning and achievement: Theory and research. *Handbook of Psychology, Second Edition*, 7.

- Sugiyono, D. (2013). *Metode penelitian pendidikan pendekatan kuantitatif, kualitatif dan R&D*.
- Surya, M. (2015). Strategi kognitif dalam proses pembelajaran. *Bandung: Alfabeta*.
- Sutarsa, D. A., & Puspitasari, N. (2021). Perbandingan Kemampuan Berpikir Kritis Matematis Siswa antara Model Pembelajaran GI dan PBL. *Plusminus: Jurnal Pendidikan Matematika*, 1(1), 169–182.
- Sutarto, S. (2017). Teori Kognitif dan Implikasinya Dalam Pembelajaran. *Islamic Counseling: Jurnal Bimbingan Konseling Islam*, 1(2), 1. <https://doi.org/10.29240/jbk.v1i2.331>
- Wijayanto, R., & Santoso, R. H. (2018). Pengembangan Bahan Ajar Matematika Dengan Pendekatan Problem Solving Berorientasi Pada Kemampuan Pemecahan Masalah. *Jurnal Pedagogi Matematika*, 7(3), 95–104.

